IN THE CLAIMS

This listing of the claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) An interface assembly for attaching a spacecraft payload to a launch vehicle, comprising:

a payload attach fitting configured to couple the payload to the launch vehicle;

a shock and vibration isolation assembly coupled to the payload attach fitting, the shock and vibration isolation assembly comprising:

a spring plate;

a stop assembly incorporated into the spring plate; and

a damping device mounted to the spring plate, wherein at least a portion of the damping device is disposed above the spring plate, wherein the stop assembly is configured to limit the deflection of the spring plate, and the damping device is configured to dampen the natural oscillation frequency of the spring plate.

2. (Original) The interface assembly of claim 1 wherein the spring plate has an internal opening to allow for compression and expansion of the spring plate under load conditions.

3. (Original) The interface assembly of claim 1 wherein the spring plate is fabricated from a high-strength, lightweight material.

4. (Original) The interface assembly of claim 1 wherein the spring plate is fabricated from aluminum.

5. (Original) The interface assembly of claim 1 wherein the spring plate is fabricated from magnesium.

6. (Original) The interface assembly of claim 1 wherein the spring plate is fabricated from graphite/epoxy composite laminate.

7. (Original) The interface assembly of claim 1 wherein the spring plate is fabricated from titanium.

8. (Original) The interface assembly of claim 1 wherein the stop assembly is configured to limit both the compression and tension of the spring plate to approximately 0.01 inch.

9. (Original) The interface assembly of claim 1 wherein the natural oscillation frequency of the spring plate is approximately 40 Hz.

10. (Original) The interface assembly of claim 9 wherein the damping device causes the spring plate to have a damping constant of approximately 20%.

11. (Original) The interface assembly of claim 1 wherein the damping device comprises a piston housed within a magnetized cylinder assembly filled with a magnetic damping medium.

12. (Original) The interface assembly of claim 11 wherein the magnetic damping medium is a Magnetorheological fluid.

13. (Original) The interface assembly of claim 11 wherein the drag force of the piston attenuates shock and vibration energy in an approximate frequency range of 100 to 300Hz.

14. (Withdrawn) The interface assembly of claim 1 wherein the damping device comprises a layer of damping material applied to the outer surfaces of the spring plate, the damping material layer being constrained by an attached outer plate.

15. (Withdrawn) The interface assembly of claim 14 wherein the layer of damping material is fabricated from a visco-elastic material.

16. (Withdrawn) interface assembly of claim 14 wherein the outer plate is fabricated from aluminum.

17. (Withdrawn) A spacecraft, comprising:

a payload;

a launch vehicle; and

an interface assembly connected between the payload and the launch vehicle, the interface assembly having a payload attach fitting connected to a shock and vibration isolation assembly, wherein the shock and vibration isolation assembly is comprised of a spring plate, a stop assembly and a damping device, wherein the stop assembly is configured to limit the deflection of the spring plate, and the damping device is configured to dampen the natural oscillation frequency of the spring plate.

18. (Withdrawn) A damping device for coupling to a spring plate within a shock and vibration isolation system, comprising:

a magnetized cylinder having a central cavity;

a piston displaced within the central cavity; and

a magnetic damping medium disposed between the piston and magnetized cylinder, wherein the viscous interaction between the magnetic damping medium and the magnetized cylinder causes the drag force of the piston to dampen the natural oscillation frequency of the spring plate.

19. (Withdrawn) An interface assembly for attaching a spacecraft payload to a launch vehicle via a payload attach fitting, the interface assembly having a shock and vibration isolation assembly coupled to the payload attach fitting, the shock and vibration isolation assembly comprising:

a spring plate;

a stop assembly incorporated into the spring plate to thereby limit the deflection of the spring plate; and

a damping device mounted to the spring plate to dampen the natural oscillation frequency of the spring plate, wherein the damping device comprises a piston housed within a magnetized cylinder assembly filled with a Magnetorheological fluid.

20. (New) The interface assembly of claim 1 wherein the damping device comprises a piston housed within a cylinder assembly.

21. (New) The interface assembly of claim 20 wherein the cylinder assembly comprises a magnetized cylinder assembly.

22. (New) The interface assembly of claim 21 wherein the magnetized cylinder assembly is filled with a magnetic damping medium.

23. (New) The interface assembly of claim 22 wherein the magnetic damping medium is a Magnetorheological fluid.

24. (New) The interface assembly of claim 20 wherein the drag force of the piston attenuates shock and vibration energy in an approximate frequency range of 100 to 300Hz.

25. (New) The interface assembly of claim 1 wherein the piston extends through the spring plate.

26. (New) The interface assembly of claim 1 wherein the stop assembly comprises a stop disposed within the spring plate, wherein the stop is configured to limit deflection of the spring plate.

27. (New) The interface assembly of claim 26 wherein the stop assembly further comprises a bolt inserted through the stop, wherein the bolt is configured to limit expansion of the spring plate.

28. (New) The interface assembly of claim 1 wherein the stop assembly extends substantially perpendicular to and through the spring plate.

29. (New) The interface assembly of claim 1 wherein the stop assembly extends substantially parallel to the damping device.